

FAA William J. Hughes Technical Center

Air Traffic Control Human Factors

Research and Development Human Factors Laboratory

The air traffic control (ATC) concept and acquisition supports the human factors program examines current issues and advanced concepts that relate to human performance in the National Airspace System.

Research professionals at the FAA William J. Hughes Technical Center focus on the development and improvement of person-machine relationships in the National Airspace System (NAS). These scientists with the NAS Human Factors Branch and the Research and Development Human Factors Laboratory (RDHFL) work directly with the user community to maximize the potential of new and modified equipment as well as study operational concepts.

Human Factors specialists and engineers study both future air traffic control concepts and current technology that the FAA is considering. They employ state-of-the-art air traffic control simulation and prototyping capabilities, creating a high fidelity environment that mirrors current and future implementation.

Controllers visit the laboratory and participate directly in the studies experiencing, in simulation, everything they will see if a concept or new technology is fielded. This provides a reliable and valid test bed for drawing conclusions about how the FAA can employ technology to its maximum potential.

The laboratory can do approach control and enroute prototyping as well as simulation research. It is highly flexible and can be reconfigured to meet current needs. Researchers can monitor and measure everything that occurs in a simulation. Over the past 40 years, the William J. Hughes Technical Center has been an industry leader in the

development of air traffic control performance metrics for use in systems evaluation. The following paragraphs describe some of this work.

Researchers have designed a new performance rating form for over-the-shoulder observational evaluations. Form designers assessed reliability and validity against objective system measures in real-time simulations. Researchers have also developed multiple measures of controller workload. The Human Factors Branch consolidated ATC measurements tools into a database, which is available to researchers working on any current or future systems issues.

The Human Factors Laboratory uses state-of-the-art eye-tracking equipment to evaluate scanning behavior. Controller visual scanning is a potential source of human error. Controller scanning patterns change over time, as a function of systems loads and as influenced by overflights that the controller is not actively controlling. Controllers obtain the majority of their visual information only when looking directly at and fixating a specific object or event. Eye-tracking equipment can be used to evaluate the impact of new displays on controller scanning behavior.

Researchers at the RDHFL have completed several simulation studies to investigate the effects of new operational concepts, such as user preferred routes and shared separation responsibility, on air traffic controller performance, situation awareness, and workload.

For more information on the Air Traffic Control Human Factors, contact:

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System Efficiency